f

DOCUMENT

document title/ titre du document

THE GPS RECEIVER NETWORK OF ESOC: MASPALOMAS, KOUROU, KIRUNA, PERTH, VILLAFRANCA AND MALINDI

C. GARCIA, J.M. DOW, R. ZANDBERGEN, J. FELTENS, I. ROMERO, J. PEREZ

ESA/EUROPEAN SPACE OPERATIONS CENTRE

DARMSTADT, GERMANY

prepared by/*préparé par*

reference/*réference*	
issue/*édition*	1
revision/*révision*	0
date of issue/*date d'édition*	
status/*état*	Draft
Document type/*type de document*	Technical Note
Distribution/*distribution*	

A P P R O V A L

Title *titre*	issue *issue*	1 revision 0 *revision*

author *auteur* date *date*

approved by *approuvé by* date *date*

C H A N G E L O G

reason for change /*raison du changement*	issue/*issue*	revision/*revision*	date/*date*

C H A N G E R E C O R D

Issue: 1 Revision: 0

reason for change/*raison du changement*	page(s)/*page(s)*	paragraph(s)/*paragraph(s)*

TABLE OF CONTENTS

1 OVERALL HARDWARE CONFIGURATION

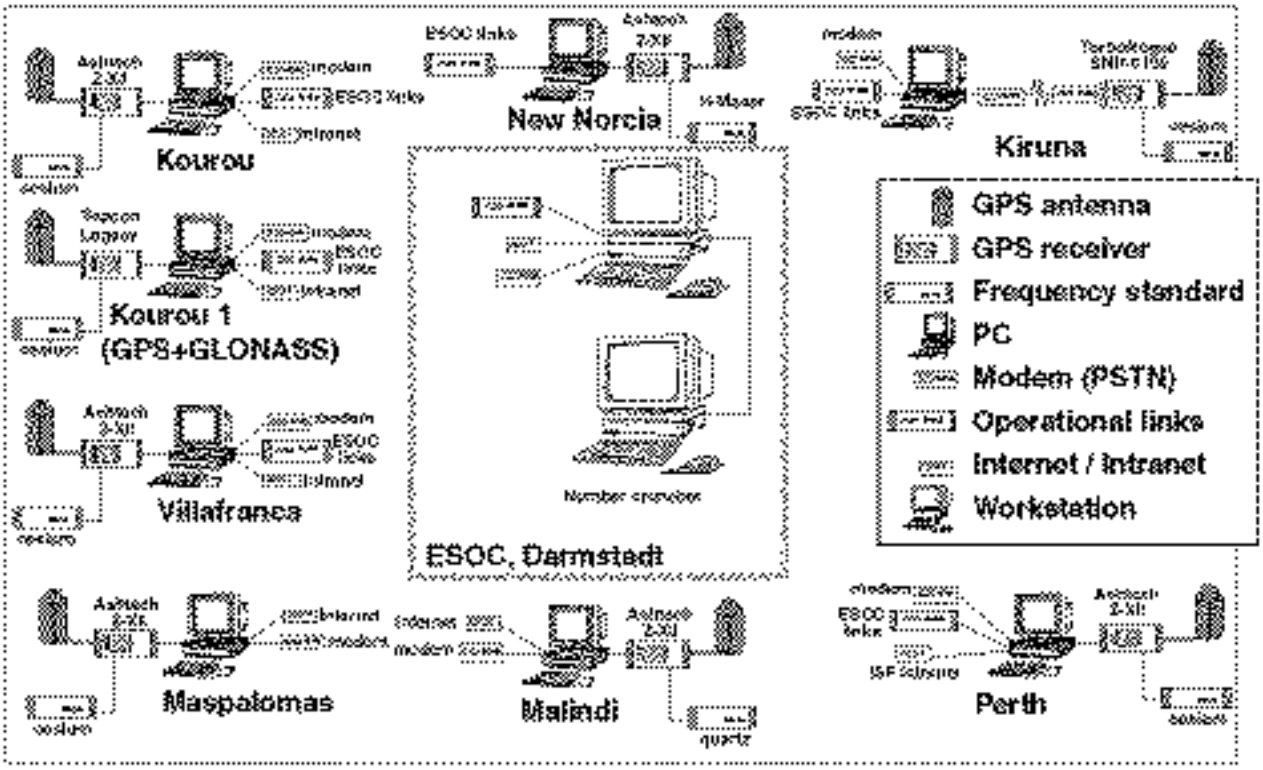

Figure 1 shows the configuration of the ESA stations by middle 2002.

2 NETWORK VISIBILITY

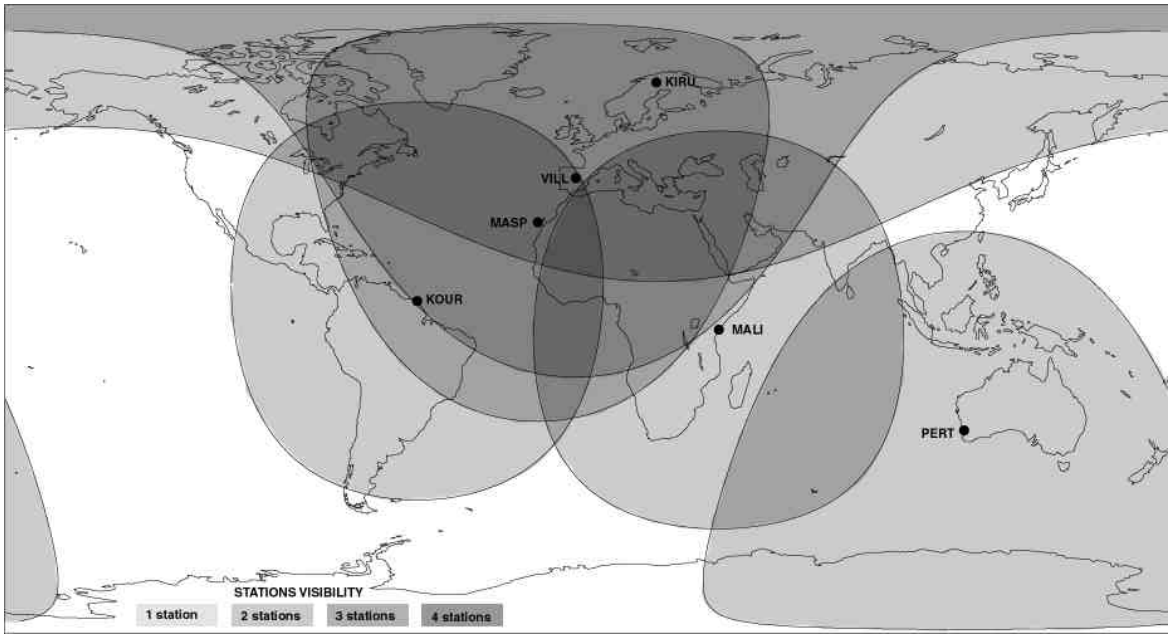

Figure 2 shows the visibility of the ESA network with 20 degree minimum elevation.

3 RECEIVER PERFORMANCE

During the year 2001 ESOC has continued the plans to upgrade the stations with Ashtech Z-XII receivers. The following summarizes the status and upgrades that took place in 2001:

In Kiruna (KIRU) the receiver in operation was an AOA SNR-8100 ACT that was upgraded the previous year (September 2000).

In Kourou (KOUR) the Ashtech Z-XII had been upgraded in March 2000.

In Malindi (MALI) the Ashtech Z-XII was installed in April 2001 to replace the TurboRogue receiver.

Maspalomas (MAS1) was the first ACT upgrade in August 1999, but the new receiver failed some months later and had to be replaced by an Ashtech Z-XII in December 2000. During 2001 the receiver performance was nominal.

In Perth (PERT), due to the geographical location, the cross correlation receiver had an acceptable performance and the receiver was only replaced in June 2001 after the failure of the TurboRogue.

Villafranca (VILL) was upgraded to an AOA ACT receiver in July 2000. A similar situation to Maspalomas with a failure of the upgraded receiver some months later made necessary the replacement by an Ashtech Z-XII by the beginning of 2001.

The Topcon Legacy combined GPS+GLONASS receiver was installed at Kourou (KOU1) and started the data collection by the end of 2001.

4 COMMUNICATIONS

The communications to the ESA stations has been traditionally based on the permanent operational lines existing for Kiruna, Kourou, Perth and Villafranca and dial-up modems for the rest (Malindi and Maspalomas).

During 2001 the communications links have improved thanks to the development of the IP connectivity in the remote stations, either via the ESA Intranet or Internet. The IP Intranet is used in Villafranca and Kourou and the permanent Internet connectivity in Malindi and Maspalomas. Kiruna uses an asynchronous X.25 permanent line. Perth is downloaded through a modem connection to a local Internet Service Provider (ISP).

The implementation of permanent IP lines will make possible the future development of real time 1 Hz data downloads.

The remote computers that support the receivers are Windows NT PCs with remote control for computer and receiver housekeeping. The operation is automatic and autonomous.

5 HIGH RATE DATA CAPABILITY

Thanks to the new Ashtech receivers and the new TCP/IP communications the ESA stations are able to produce 1 Hz data in subdaily downloads. It has been demonstrated in various high rate data collection campaigns like the HIRAC/Solarmax in April 2001.

The new Ashtech Z-XII receivers can internally store and download 1 Hz data. They do not present any problems in the second frequency tracking at equatorial stations caused by high ionospheric activity. The older TurboRogues were only capable of 3 seconds sampling by using the internal memory and CPU resources.

The Internet lines, developed for the bandwidth requirements of the web browsers, can download the 1 Hz data collected during one hour in a few minutes.

6 ONE-HOUR DOWNLOADS

In 2001 Maspalomas and Malindi joined the rest of stations that provide hourly data since 1999 (Kiruna, Kourou, Perth and Villafranca).

Maspalomas started in December 2000, in the beginning by using connectivity from a local Internet Service Provider and finally by using a 2 Mbits line of the station.

Malindi started the hourly downloads in 2001 using the Internet connection provided by the University of Rome at the San Marco station.

The hourly data are currently used for the computation of the ESA Rapid and Ultra Rapid products.

7 ESA WEB PAGES

Updated information and pictures of the stations can be found in the ESOC web pages:

http://nng.esoc.esa.de

8 REFERENCES

- GPS-TDAF Stations Configuration Manual. Version 1.5, May 2002.

- The GPS receiver Network of ESOC: Maspalomas, Kourou, Kiruna, Perth, Villafranca and Malindi. C. Garcia-Martinez, J.M. Dow, T. Martin-Mur, J. Feltens, P. Bernedo. 1998 Technical Reports. IGS Central Bureau.

- ESA/ESOC IGS Analysis Centre Poster Summary. C. Garcia-Martinez, J.M. Dow, T. Martin-Mur, J. Feltens, P. Bernedo. 1998 IGS Network Systems Workshop.